Virtualization and GNU/Linux

What are the goals of this lecture?

- Clarify What is Virtualization
- Get a general idea about Hypervisors
- Get a general Idea about GNU/Linux OS
- Know the basics of using a hypervisor (Virtualbox in our case)
- Know how to install a GNU/Linux distribution to experiment within an isolated environment

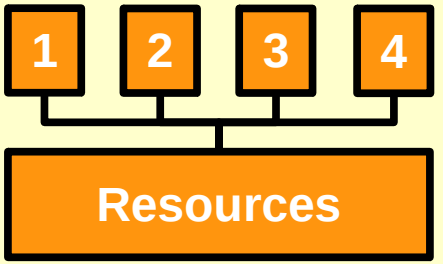
Why you should care?

In practical reality, you will be responsible for one or more of these (or at least **need** to achieve)

Compatibility

Security

Dividing Resources

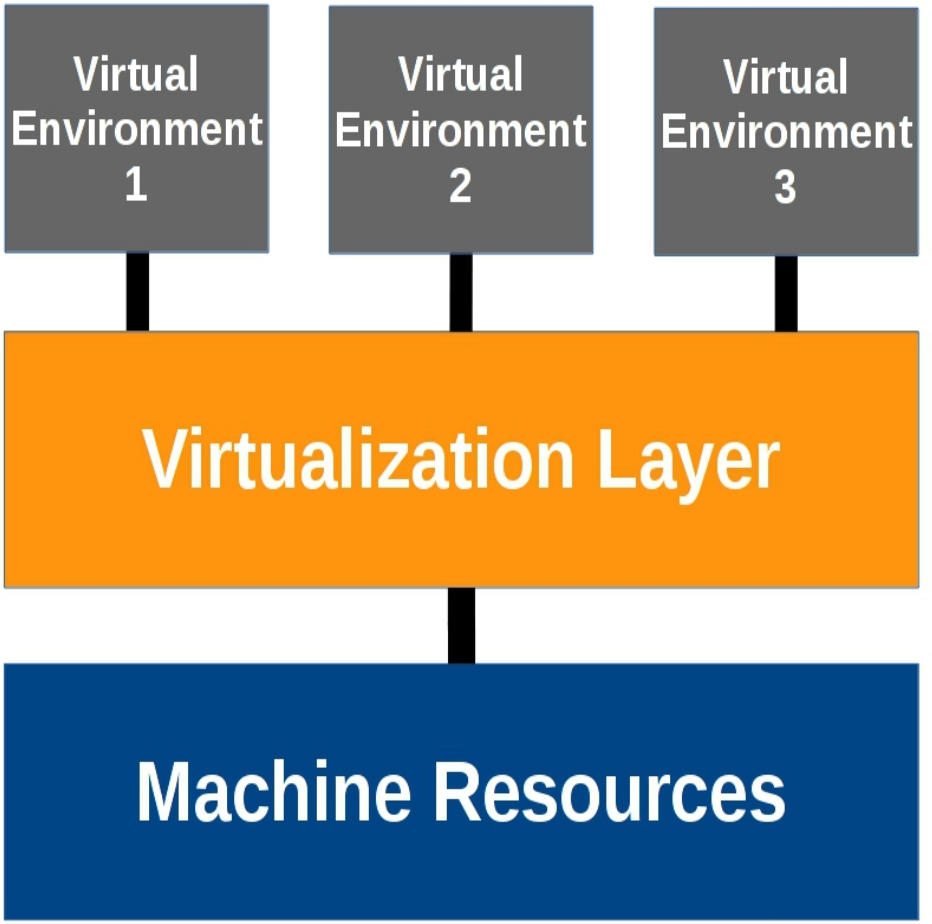


Creating New Possibilities

Virtualization

- It is the creation of a virtual version of something.

- A very important application is dividing resources in the form of a virtual environment. Like What you get with **Hypervisors**



Hypervisors

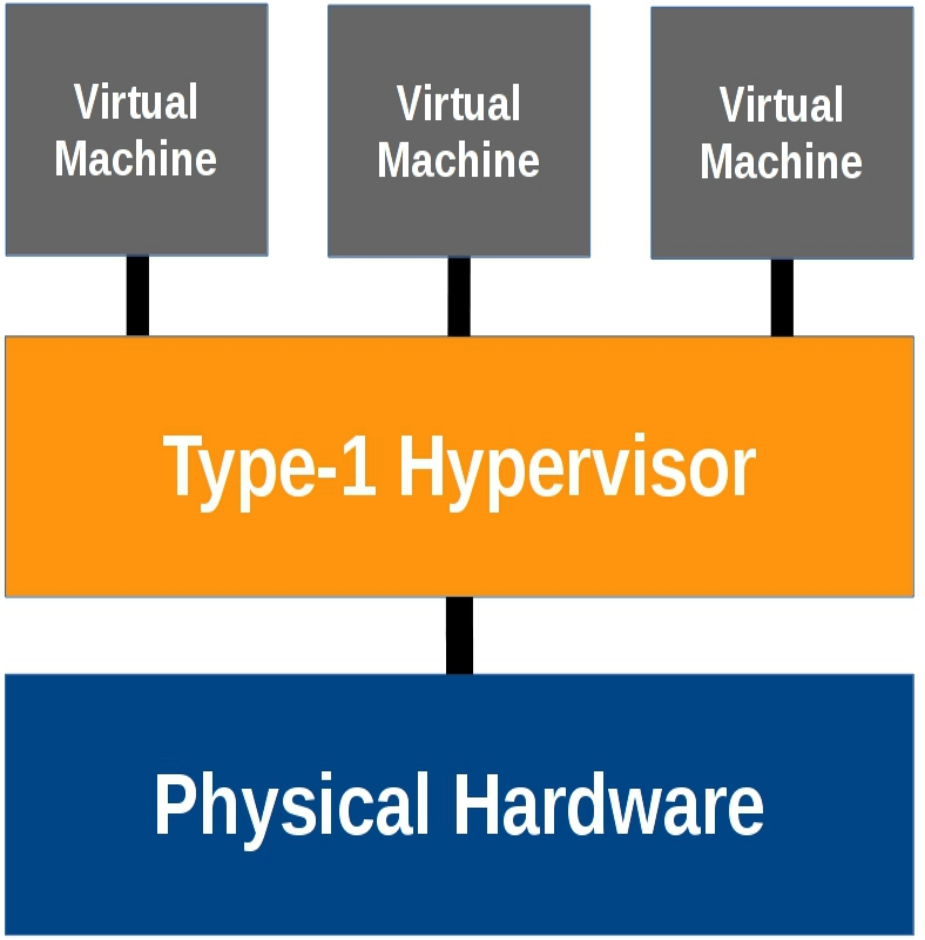
- A software that lets you to run multiple operating system simultaneously on a single machine, sharing the resources of that single machine.
- The hypervisor is installed on a **Host** machine, while the created virtual machines are called **Guests.**
- They are categorized into two types:
  - **Type-1** Hypervisors
  - **Type-2** Hypervisors

Type-1 Hypervisors

- Also called **native** or **bare-metal** hypervisors.
- These are installed and run directly on the host machine's hardware. And they are called bare-metal for that reason.
- They are high performance hypervisors but not targeted towards the consumers and average users.
- Examples of this type are:

  1- Xen Hypervisor

  2- VMware ESXi



Xen Project

vmware®

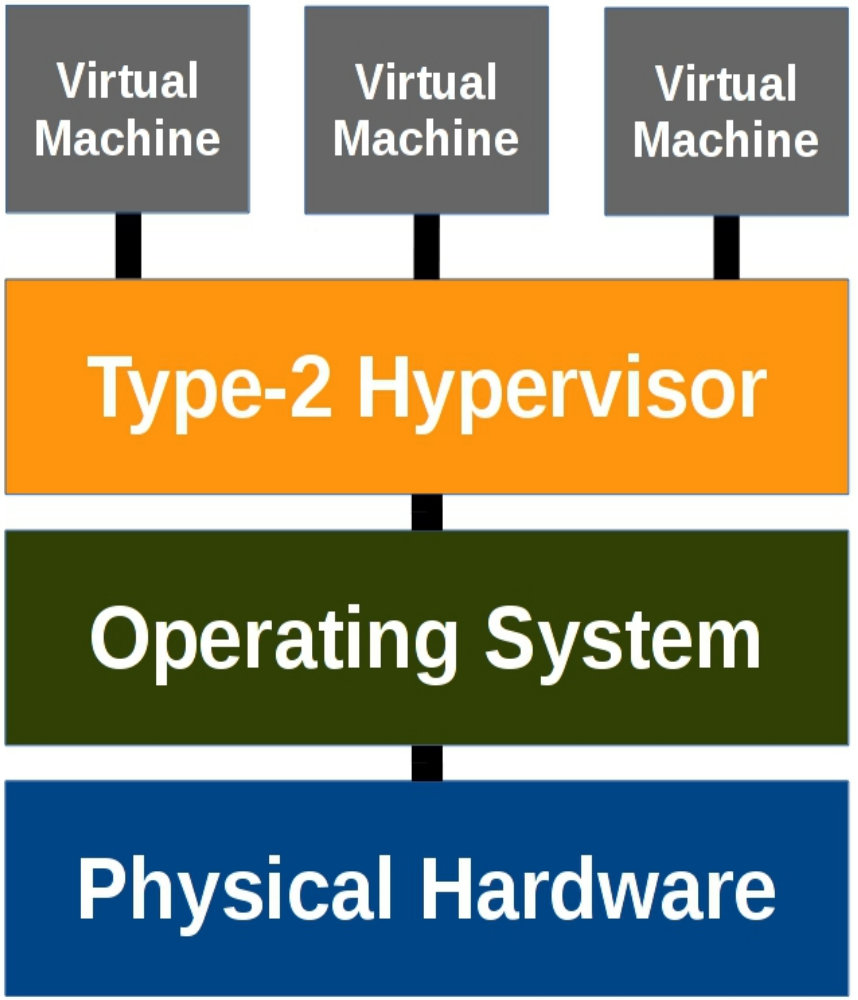
Type-2 Hypervisors

- Also called hosted hypervisors
- They are installed on an existing operating system like Windows, GNU/Linux, Mac and Solaris.
- They usually offer easy to use GUI tools. but are usually slower than Type-1.
- Examples of this type are:

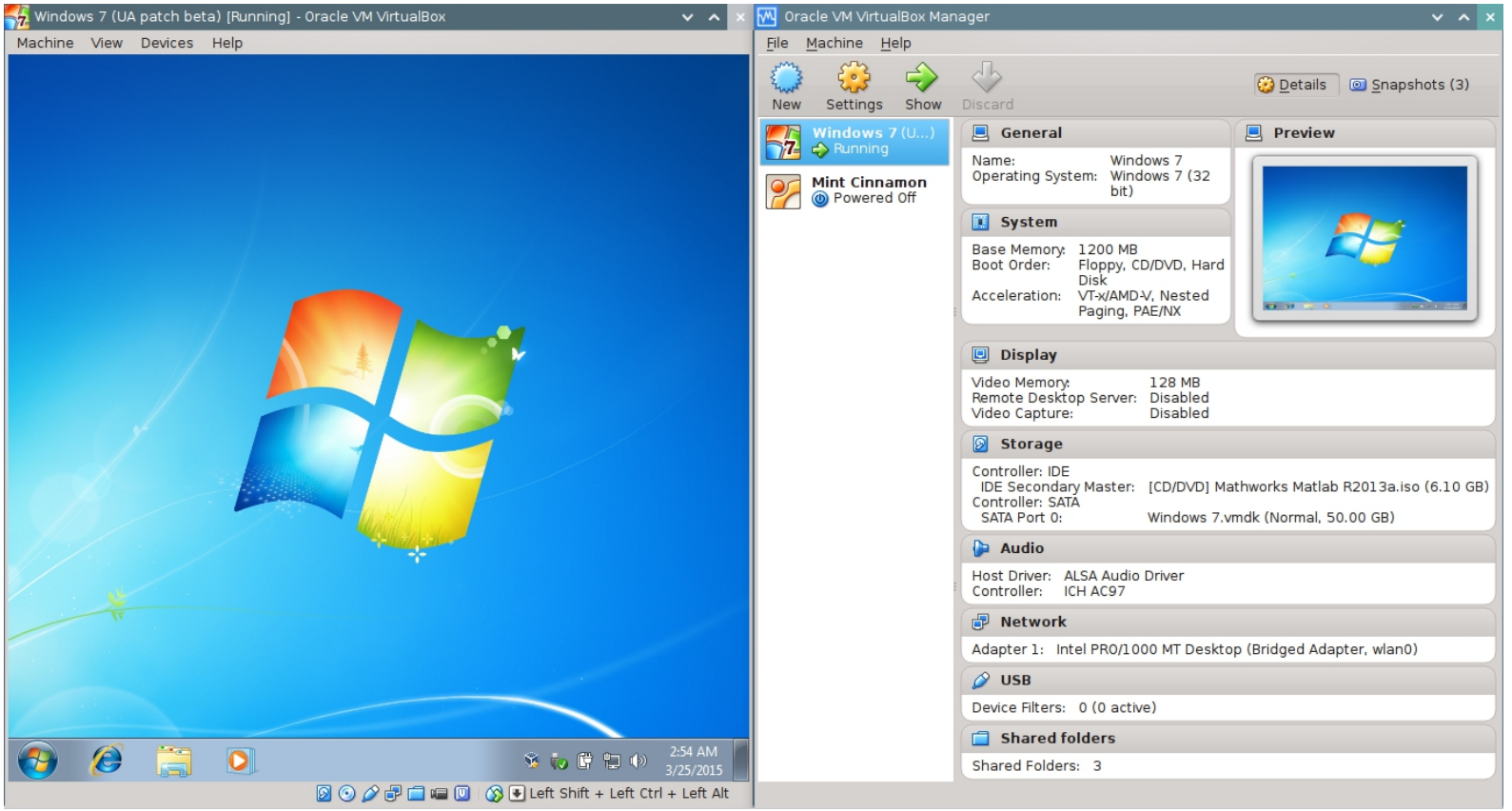
  1- VMware (Player, Workstation)

  2- Parallels (for Macs only)

  3- Oracle Virtualbox



Virtualbox as a Type-2 Hypervisor



- It is available to install on most known systems (Windows, Linux, Mac and Solaris)
- A major drawback with Type-2 hypervisor's virtual machines is the bad 3D acceleration, so it is not good for any gaming or heavy graphics work.
- This is not a big issue since we are not going to do any graphical intensive work on our virtual machine.

Why Virtualbox is chosen?

We can summarize the reasons for using Virtualbox as this:

1- Very easy to use with a graphical interface.

2- Can be installed on most popular operating systems.

3- Free software. You don't have to purchase a license.

4- Fair amount of features considering the free price.

You can check the supported guest operating systems that you can install using Virtualbox from this link:

https://www.virtualbox.org/wiki/Guest_OSes

GNU/Linux and Linux Mint

- The Linux distribution we will be using is Linux Mint.
- GNU/Linux is an operating system (just like your Windows 7 or Windows 8.1 or Mac). It is more known as Linux for short.
- Linux itself is the kernel, Which is the part of the operating system that manages the hardware.
- GNU are a set of tools and libraries developed to be an operating system, but there was no kernel at the time of making it. So by having GNU tools with Linux kernel we get GNU/Linux operating system. Which is known as Linux

GNU/Linux and Linux Mint

- Linux is widely used and adopted by many coders and corporations. It is now an essential part of the Internet. It even powers your Android phone or your new fancy car!
- Linux Mint will be used for the following reasons:

  1- It is very user friendly so it is very easy to use.

  2- Virtualbox Guest Additions are pre-installed.Just install it on Virtualbox and you are ready to work.

  3- Audio and video codecs are pre-installed with some useful software. So you can play media out of the box.

  4- Based on Ubuntu, so most what works for Ubuntu works for Mint.

Let's get started !

Links to Images:

Legacy Hardware Image:
http://sphinux.org/s/legacyHW
Testing Software Image:
http://sphinux.org/s/testSW
Virtual Reality:
http://sphinux.org/s/vr
Xen logo:
http://sphinux.org/s/xenlogo
VMware logo:
http://sphinux.org/s/vmwarelogo

Parallels logo:
http://sphinux.org/s/parallelslogo
Virtualbox logo:
http://sphinux.org/s/vboxlogo
Type-1 figure:
http://sphinux.org/s/t1hp
Type-2 figure:
http://sphinux.org/s/t2hp
Virtualization figure:
http://sphinux.org/s/virtlayer
Virtualbox:
http://sphinux.org/s/vboxex

Thank You =)